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TITLE: MANUFACTURE OF CERAMIC ELECTRONIC PART

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INVENTOR-INFORMATION:

NAME

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ABSTRACT:

PROBLEM TO BE SOLVED: To prevent a ceramic electronic part from deteriorating in characteristics due to partial elution of ceramic into water at the time when a burned ceramic chip which contains alkaline earth metals such as Ba, Sr, Ca and the like is polished in water.

SOLUTION: A burned ceramic chip is polished in a non-aqueous liquid so as to prevent the ceramic chip from being adversely influenced by water. Fluorine-based inert liquid such as hydrofluoroether, hydrofluorocarbon, or chlorofluorocarbon is especially favorably used as non-aqueous liquid.

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1. Untranslatable words are replaced with asterisks (\*\*\*\*).
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## CLAIMS

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**[Claim(s)]**

**[Claim 1]** The manufacture method of the ceramic electronic parts which are equipped with the process which grinds the ceramic chip after calcination used as the main part of parts for ceramic electronic parts in a liquid, and are characterized by using a nonaqueous system liquid as said liquid.

**[Claim 2]** Said ceramic chip is the manufacture method of ceramic electronic parts according to claim 1 including the quality of the material which dissolves in water or reacts with water.

**[Claim 3]** Said nonaqueous system liquid is the manufacture method of the ceramic electronic parts according to claim 1 or 2 which are fluoride system inactivity liquids.

**[Claim 4]** Said polish process is the manufacture method of the ceramic electronic parts according to claim 1 to 3 carried out by making polish Media intermingled in said nonaqueous system liquid.

**[Claim 5]** Said polish process is the manufacture method of ceramic electronic parts according to claim 1 to 4 including a barrel-polishing process.

**[Claim 6]** Said ceramic chip has the lamination structure of the ceramics which form the internal conductor exposed to the surface outside predetermined, and after said polish process The manufacture method of the ceramic electronic parts according to claim 1 to 5 further equipped with the process which forms a terminal electrode on the surface outside said ceramic chip so that it may connect with said internal conductor.

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## DETAILED DESCRIPTION

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the manufacture method of ceramic electronic parts, and relates to the improvement in the process which grinds the ceramic chip after the

calcination which serves as a main part of parts for ceramic electronic parts especially.

[0002]

[Description of the Prior Art] For example, generally in the manufacture process of ceramic electronic parts like a lamination ceramic condenser, grinding the ceramic chip after calcination used as the main part of parts for ceramic electronic parts is performed. This polish forms an internal conductor [ like an internal electrode ] whose ceramic chip is as a measure for preventing the crack and chip which have produced at the time of the handling of a ceramic chip. When being formed so that a terminal electrode may be connected to an internal conductor on the outside surface, it carries out as a measure for acquiring the good connection state between these inside conductor and a terminal electrode.

[0003] Polish of a ceramic chip which was conventionally mentioned above, Put in two or more ceramic chips which should be ground in water, and necessity is accepted. [ polish Media which exerts a buffer action on a ceramic chip at the time of granular polish Media for promoting polish, and/or polish and which consists of ceramic powder, for example ] as a state where you made it intermingled underwater For example, by applying barrel polishing, carrying out by giving mechanical operation of rotation or vibration to a ceramic chip is thought out.

[0004]

[Problem(s) to be Solved by the Invention] However, as mentioned above, when a ceramic chip was ground underwater, the desired characteristic could not be pulled out from the ceramic electronic parts constituted using the ceramic chip which finished polish. When the cause was pursued, it turned out that the water which contacts a ceramic chip at the time of polish dissolving a part of quality of the material included in a ceramic chip, or reacting with a part of such the quality of the material results.

[0005] If the ceramic chip contains the ceramics containing alkaline-earth metals, such as Ba, Sr, and Ca, contains the glass containing alkaline metals, such as Li, or contains boron system glass in detail These parts react with water, and ionize, or serve as hydroxide, and may begin to melt. In addition, in order to avoid the bad influence of water to the ceramic chip after calcination which was mentioned above, the trial of grinding the chip before calcination is also made. However, in the case of the ceramic electronic parts which have the structure where the internal conductor formed in the inside of a ceramic chip and the terminal electrode formed on the outside surface are connected like a lamination ceramic condenser, as mentioned above If it calcinates after polish and is made not to grind after calcination entirely, it will be easy to produce the faulty connection between an internal conductor and a terminal electrode.

[0006] Then, the purpose of this invention is to offer the manufacture method of the ceramic electronic parts which can solve a technical technical problem which was mentioned above.

[0007]

[Means for Solving the Problem] This invention is turned to the manufacture method of ceramic

electronic parts equipped with the process which grinds the ceramic chip after calcination used as the main part of parts for ceramic electronic parts in a liquid, and it is characterized by using a nonaqueous system liquid as a liquid in order to solve the technical technical problem mentioned above.

[0008] Especially this invention is advantageously applied, when a ceramic chip includes the quality of the material which dissolves in water or reacts with water. Moreover, in this invention, a fluoride system inactivity liquid can be conveniently used as a nonaqueous system liquid. Moreover, a polish process makes polish Media for exerting a buffer action on a ceramic chip at the time of polish Media for promoting polish, and/or polish etc. intermingled in a nonaqueous system liquid, and may be carried out.

[0009] Moreover, in a polish process, barrel polishing is applied, for example. Moreover, the ceramic chip has the lamination structure of the ceramics which form the internal conductor exposed to the surface outside predetermined, and this invention is advantageously applied, when manufacturing the ceramic electronic parts with which a terminal electrode is formed on the surface outside a ceramic chip so that it may connect with an internal conductor. In this case, in the manufacture method of the ceramic electronic parts concerning this invention, forming a terminal electrode on the surface outside a ceramic chip so that it may connect with an internal conductor after a polish process is performed.

[0010]

[Embodiment of the Invention] The manufacture method of a lamination ceramic condenser is explained as one embodiment of this invention. In order to obtain a lamination ceramic condenser, the ceramic chip after calcination used as the main part of parts is prepared first. This ceramic chip has the lamination structure of the ceramics which form two or more internal electrodes as an internal conductor exposed to the surface outside predetermined as everyone knows. Moreover, the external electrode as a terminal electrode is formed on the surface outside a ceramic chip, and it is considered as a desired lamination ceramic condenser so that it may connect with each internal electrode.

[0011] The above ceramic chips are after calcination, and before they form an external electrode, they are given to a polish process. [ a process ] while this polish process prevents the crack and chip which may be produced at the time of the handling after calcination of a ceramic chip It carries out in order to acquire the good connection state of an internal electrode and an external electrode, and while the angle of a ceramic chip or the portion of \*\* is shaved off by this polish and roundness is given, a part of surface portions, such as an end face, are shaved off.

[0012] Such polish puts in two or more ceramic chips after calcination into a liquid, and it is carried out, giving mechanical operation like rotation or vibration to a ceramic chip. At this time, it is just going to consider it as the feature of this invention as an above-mentioned liquid to use

not water but a nonaqueous system liquid. As a nonaqueous system liquid, fluoride system inactivity liquids (solvent), such as high draw FURORO ether, high draw fluorocarbon, and chlorofluorocarbon, can be used the most practical. These fluoride system inactivity liquid is nonflammability, and it is because explosion-proof equipment etc. is unnecessary.

[0013] In addition, the other aliphatic hydrocarbon but not only the above fluoride system inactivity liquids Aromatic hydrocarbon, halogenated hydrocarbon, alcohols, and ketone Even if it uses the liquid (solvent) of ester, ether, alcoholic ester, ketone alcohol, ether alcohol, ketone ether, ketone ester, and ester ether, it is usable enough from a point of the function of elution prevention of ceramics.

[0014] Moreover, typically in a polish process, barrel polishing is applied. Barrel polishing is carried out under the following conditions, for example.

Revolving speed the time of revolution of 60-100rpm of an amount of barrel capacity 500cc nonaqueous system liquids 150cc ceramic chip 150cc barrel You may make polish Media which consists of ceramic powder which does a buffer action to granular polish Media for promoting polish, or a ceramic chip intermingled in a nonaqueous system liquid on the barrel-polishing conditions mentioned above for 60 minutes. When using a liquid with high viscosity as a nonaqueous system liquid especially, it is not necessary to put in polish Media which does a buffer action like ceramic powder but, and in using a liquid with low viscosity, it puts in polish Media for doing such a buffer action in many cases. Moreover, it is ground by collision of ceramic chips when not putting in polish Media for promoting polish.

[0015] When polish Media is used after finishing polish, the nonaqueous system liquid which the ceramic chip was separated from polish Media, and adhered to the ceramic chip surface is removed. If a volatile high thing is used as a nonaqueous system liquid in this removal, a nonaqueous system liquid is efficiently removable with volatilization. Therefore, it is desirable to use a volatile high nonaqueous system liquid as a nonaqueous system liquid.

[0016] On the surface, an external electrode is formed outside the ceramic chip which finished polish and finished removal of the nonaqueous system liquid, and a desired lamination ceramic condenser is obtained by it. This invention is especially applied advantageously, when a ceramic chip includes the quality of the material which dissolves in water or reacts with water. Namely, the case where a ceramic chip contains the ceramics containing alkaline-earth metals, such as Ba, Sr, and Ca, as mentioned above, when the glass containing alkaline metals, such as Li, is included, or when boron system glass is included, it sets. It is because these react with water, and ionize, or become hydroxide and may begin to melt.

[0017] In order to check this effect of the invention, after grinding the ceramic chip constituted using the ceramics of a barium titanate system in various liquids, respectively, When degradation of the initial failure of the insulation resistance after formation of an external electrode and the insulation resistance after the high temperature load examination of 250

hours is evaluated, about each obtained lamination ceramic condenser as a liquid As opposed to degradation of the insulation resistance after high temperature load having been accepted in the initial failure of insulation resistance, and about 30% of sample in about 20% of sample, when water was used When various kinds of nonaqueous system liquids were used, also in any at the time of making polish Media intermingled into these nonaqueous system liquid, neither the initial failure of such insulation resistance nor degradation was accepted.

[0018]

[Effect of the Invention] As mentioned above, since according to this invention a nonaqueous system liquid is used as a liquid when grinding the ceramic chip after calcination in a liquid Even if it is the ceramic chip including the quality of the material on which it has a bad influence with water, it can prevent that the characteristic pulled out from the ceramic electronic parts which could grind satisfactorily, therefore were obtained using such a ceramic chip deteriorates by polish.

[0019] The ceramic chip has especially the lamination structure of the ceramics which form the internal conductor exposed to the surface outside predetermined like a lamination ceramic condenser. When this invention is applied to the manufacture method of such ceramic electronic parts that a terminal electrode is formed, on the surface outside a ceramic chip so that it may connect with an internal electrode, the effect of being done so by this invention will become much more significant. It is because positive connection must be attained between an internal conductor and a terminal electrode in the case of such ceramic electronic parts, so the process of grinding for the chip before calcination and calcinating after polish is not employable.

[0020] Moreover, as a nonaqueous system liquid in this invention if fluoride system inactivity liquids (solvent), such as high draw FURORO ether, high draw fluorocarbon, and chlorofluorocarbon, are used These fluoride system inactivity liquid is nonflammability, and since explosion-proof equipment etc. is unnecessary, it can carry out the polish process which was more excellent practical.

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[Translation done.]